REMARKS

This is in response to the Office Action dated December 6, 2005.

Per the above amendment, claims 1, 2, 5, 7, 13, 14, 16 and 17 have been amended, claims 9 and 11 canceled, and new claims 18-27 added to further clarify the present invention.

Claims 1 and 13 were rejected under 35 U.S.C. 102(b) as being anticipated by Rochester (US 5,687,175).

Claims 1 and 13 each have been amended to contain the feature of "a plurality of responses of a single on-vehicle device to a polling signal is received in a road-side device (by second means)" and the feature of "radio communications with the on-vehicle device is started when it is decided that the road-side device (by third means) receives a plurality of responses of a single on-vehicle device to a polling signal".

These features are believed to be supported at lines 6-13 of page 28 of the present specification.

Differences between the present invention defined by the amended claims 1 and 13 and Rochester are discussed hereinbelow.

The present invention teaches an electronic toll collection system having a road-side device. The road-side device transmits a poll signal. When receiving a plurality of responses to the polling signal from a single on-vehicle device, the road-side device starts next radio communications with the on-vehicle device.

Because the road-side device does not start next radio communications with an on-vehicle device until the road-side device receives a plurality of responses to a polling

signal from the on-vehicle device, the road-side device can reliably detect the entering of a vehicle having the on-vehicle device into the system. Accordingly, the road-side device can stably communicate with the on-vehicle device without being suddenly disconnected from the on-vehicle device.

In contrast, Rochester teaches a system and method for an adaptive time-division multiplexing communications protocol for collecting data from remote sensors equipped with RF transceivers. The RF transceivers monitor an RF signal to ascertain the presence of an RF signal transmitted by a mobile unit (see Abstract). More specifically, a central unit (mobile unit) transmits a first signal 32 to remote units (remote sensors). Each remote unit transmits a first response signal 34 to the central unit in response to the reception of the first signal. The central unit transmits a second signal 36 to the remote units in response to the reception of the first response signal. Each remote unit transmits a data signal 38 to the central unit in response to the reception of the second signal. The central unit transmits an acknowledge signal 40 to the remote units in response to the reception of the data signal (see lines 25 to 48 of column 9).

The examiner is of opinion that first response signals of the remote units received in the central unit are equivalent to a plurality of responses received in the road-side device according to the present invention. However, the responses are not received from a plurality of on-vehicle devices but received from a single on-vehicle device. In other words, the central unit ascertains the presence of each remote unit in response to the reception of a single response signal transmitted from the remote unit, and each remote unit ascertains the presence of the central unit in response to the reception of a single first signal. Therefore, the central unit cannot ascertain the presence of each remote unit at high reliability, and each remote unit cannot ascertain the presence of the central unit at high reliability.

Claims 2 and 14 were rejected under 35 U.S.C. 102(b) as being anticipated by Rochester.

It is respectfully submitted that this rejection is also without merit in light of the following differences between the present invention defined by amended claims 2 and 14 and Rochester.

The present invention teaches an electronic toll collection system having a first vehicle sensor and a second vehicle sensor different from each other. When a vehicle is detected in both the first and second vehicle sensors or at both first and second positions, third means starts next radio communications with an on-vehicle device. Because a vehicle is detected in both the first and second vehicle sensors or at both first and second positions, the existence of a vehicle can be reliably ascertained.

In contrast, in Rochester, upon receipt of a Data Packet from each sensor, a mobile unit transmits an Acknowledge Packet signal 40 to the sensor and stores an ID of the sensor (see lines 17-22 of column 6). When the sensor does not successfully receive the Acknowledge Packet signal, the sensor continues to respond to Poll Packets. Therefore, the mobile unit is required to eliminate duplicate processing for data transmitted from the sensor many times. In order to eliminate duplicate processing, all IDs received by the mobile unit are automatically compared with the stored IDs of sensors from which data has been already received. If a corresponding ID received from a corresponding sensor is found in the stored IDs, the mobile unit again sends an Acknowledge Packet signal 40 to the corresponding sensor (see lines 29-36 of column 6). In short, when a single mobile unit receives an ID and data in duplicate from the same sensor, the mobile unit transmits a signal to the sensor to eliminate duplicate processing for the data transmitted from the sensor. Therefore, Rochester fails to teach radio communications which start based on the detection of a vehicle in different sensors or at different positions.

Claim 16 was rejected under 35 U.S.C. 102(b) as being anticipated by Rochester and Claims 5 and 17 were rejected under 35 U.S.C. 103(a) as being unpatentable over Rochester.

In consideration of these rejections, claims 5, 16 and 17 each have been amended to include the feature of "second means of an on-vehicle device [is adapted] to receive a communication end signal representing an end of transmission of the data when the communication end signal transmitted from a road-side device reaches the on-vehicle device after the on-vehicle device receives the data therefrom". See support at lines 16-22 of page 41.

Hereinbelow are the differences between the present invention as defined by amended claims 5, 16 and 17 and Rochester.

The present invention teaches an electronic toll collection system having an on-vehicle device. The on-vehicle device receives data from a road-side device and waits for a communication end signal representing an end of transmission of the data after the reception of the data. The on-vehicle device handles the data as effective data regardless of whether or not the on-vehicle device successfully receives a communication end signal.

Therefore, even when the on-vehicle device cannot ascertain whether or not the transmission of data from the road-side device has ended, the on-vehicle device can handle the received data as effective data. Accordingly, it is possible to prevent the occurrence of a disagreement in phase of signal processing between the road-side device and the on-vehicle device (see lines 1-10 of page 42 of the present specification).

In contrast, in Rochester, upon receipt of a Data Packet from each sensor, a mobile unit transmits an Acknowledge Packet signal 40 to the sensor and stores an ID of the sensor. When the sensor successfully receives the Acknowledge Packet signal, the sensor is placed into a wait state whereby it will not respond to Poll Packets (see lines 17-24 of column 6). On the other hand, when the sensor does not successfully receive the Acknowledge Packet signal, the sensor continues to respond to Poll Packets (see lines 29-30 of column 6). That is, the sensor again transmits Data Packet to the

mobile unit, and the mobile unit receiving this Data Packet compares an ID included in this Data Packet with all stored IDs to eliminate duplicate processing.

The Examiner contends that an Acknowledge Packet signal transmitted from the mobile unit (or on-vehicle device) to each sensor (or road-side device) is equivalent, in a system using RF signals, to a communication end signal which represents an end of transmission of the data and is transmitted from the road-side device to the on-vehicle device.

It is respectfully submitted that the Examiner's contention is without merit, for in Rochester, because no communication end signal is transmitted from the sensor to the mobile unit, the mobile unit cannot ascertain whether or not the transmission of data from the sensor is ended. In other words, Rochester fails to teach a communication end signal transmitted from each sensor to the mobile unit.

Further, in Rochester, when a sensor does not successfully receive an Acknowledge Packet signal, the mobile unit is required to continue transmitting another Acknowledge Packet signal to the sensor until the sensor receives the Acknowledge Packet signal. In contrast, in the present invention, it is not required to transmit a communication end signal many times from the road-side device to the on-vehicle device. The on-vehicle device can handle the data as effective data regardless of whether or not the on-vehicle device receives a communication end signal, and communication between the on-vehicle device and the road-side device can be ended.

Claim 7 was rejected under 35 U.S.C. 102(b) as being anticipated by Rochester.

Claim 7 has been amended to contain the feature of "second means of a road-side device [is adapted] to receive a communication end signal representing an end of transmission of data when the communication end signal transmitted from an on-vehicle device reaches the road-side device after reception of data".

It is respectfully submitted that this rejection is without merit in light of the herein discussed differences between the present invention defined by amended claim 7 and Rochester.

The present invention teaches an electronic toll collection system having a road-side device. The road-side device receives data from an on-vehicle device and waits a communication end signal representing an end of transmission of the data after the reception of the data. The road-side device handles the data as effective data regardless of whether or not the road-side device successfully receives a communication end signal.

Therefore, even when the road-side device cannot ascertain whether or not the transmission of data from the on-vehicle device is ended, the road-side device can handle the received data as effective data. Accordingly, it is possible to prevent the occurrence of a disagreement in phase of signal processing between the road-side device and the on-vehicle device (see lines 1-10 of page 42 of the present specification).

In contrast, in Rochester, upon receipt of a Data Packet from each sensor, a mobile unit transmits an Acknowledge Packet signal 40 to the sensor (see lines 17-20 of column 6). When the sensor does not successfully receive the Acknowledge Packet signal, the sensor does not process a first signal (or data), but continues to respond to Poll Packets (see lines 29-30 of column 6).

The Examiner asserts that an Acknowledge Packet signal transmitted from the mobile unit to each sensor is equivalent to a communication end signal representing an end of transmission of the data. It is respectfully submitted that the Examiner has misconstrued Rochester, for in Rochester, no data is transmitted from the mobile unit to the sensor, so that no communication end signal is transmitted from the mobile unit to the sensor. Therefore, the sensor cannot ascertain whether or not the transmission of

data from the mobile unit is ended. In other words, Rochester fails to teach a communication end signal transmitted from the mobile unit to each sensor.

For all of the above reasons, it is respectfully submitted that amended claims 1, 2, 5, 7, 13, 14, 16 and 17 each are clearly distinguishable from the teachings of Rochester. The Examiner is therefore respectfully requested to withdraw the 35 U.S.C. 102(b) and 35 U.S.C. 103(a) rejections.

Respectfully submitted,

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